UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 09/620,776 | 07/21/2000 | Daniel F. DiFonzo | 283014-00019 | 3993 |

27512 7590 06/03/2004

WILLIAM J. TUCKER
8650 SOUTHWESTERN BLVD. #2825
DALLAS, TX 75206

| EXAMINER | |
|---|---|
| D AGOSTA, STEPHEN M | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2683 | 19 |

DATE MAILED: 06/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/620,776 | DIFONZO ET AL. | |
| | Examiner | Art Unit | |
| | Stephen M. D'Agosta | 2683 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *19 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1,3-13,15-18,20-22,24,25,27-30 and 32-35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-13,15-18,20-22,24,25,27-30 and 32-35* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Response to Arguments*

In view of the Notice of Appeal and Appeal Brief filed on 4-19-04, PROSECUTION IS HEREBY REOPENED. A new grounds of rejection set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

The examiner notes that the claims are written very broadly and are open to interpretation – the examiner has re-read the rejection and puts forth different art that addresses the issues raised by the applicant.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

**Claims 1-4, 6-16, 18-21 and 23-33 and 35** rejected under 35 U.S.C. 103(a) as being unpatentable over Natarajan et al. U.S. Patent 5,790,070 and further in view of ~~Chen US 4,975,712~~ and Briley US 6,456,610 (hereafter referred to as Natarajan and Briley).

As per **claims 1-2, 12, 14, 18-19, 26 and 29**, Natarajan teaches a satellite/wireless communication network (abstract) comprising:

A plurality of satellites (eg. nodes), each having at least one dynamically directionally controllable communications link (C1, L40-46) wherein each of the dynamically controllable links comprises;

A network controller for dynamically changing the direction of the controllable communications links of the nodes to enable transmission of signals between nodes (figure 2, #42 in space and #52 on ground) With reference to claim 18, Natarajan teaches a satellite system (eg. hubs) having at least one dynamically directionally controlled communications link and a plurality of subscriber units (eg. remote nodes) [figure 1 and 2 show the satellite(s) and subscriber nodes]

**But is silent on** an electronic scanning antenna.

Briley teaches a cellular system that uses an electronic scanning antenna (title and abstract and figure 1) along with a Scan Control Assembly (eg. Network controller) [figure 5, #512]. The examiner notes that both land-based and spaced-based cellular system are well known in the art and would use similar hardware/software/operations to support communications. Hence one skilled would adapt Natarajan to use Briley's electronic scanning antenna to replace the ones used by Natarajan for TDMA RF communications thus reducing RF power required/transmitted to improve range over prior art systems (see Briley, C1, L5-11 and L49-67) .

It would have been obvious to one skilled in the art at the time of the invention to modify Natarajan, such that it uses an electronic scanning antenna, to provide user of a higher peak transmitter power being used to substantially improve range as compared to prior art systems.

As per **claims 3 and 20**, Natarajan teaches claim 1 wherein selected ones of the nodes further include an additional dynamically controllable communications link (figure 2 shows satellite #20 with multiple antennas #26 which is interpreted as additional links. Also, link #29 can be a multiplexed circuit containing multiple links as well).

As per **claims 4, 13, 21 and 30**, Natarajan teaches claim 1 further comprising a low data rate signaling channel for transmitting control information from the network controller to the nodes (C6, L35-40 – schedule/control information is sent from the satellite to the subscriber units).

As per **claims 7, 15, 24 and 32**, Natarajan teaches claim 1 wherein the controller changes direction of the links during a guard interval between the transmission/reception of information signals between pairs of nodes (C5, L1-20 discusses subscriber requests being translated into time intervals and C6, L25-30 details taking into account interference and/or antenna imposed constraints).

As per **claims 8 and 25**, Natarajan teaches claim 1 wherein each node includes an antenna producing at least one dynamically directionally controllable beam (figure 2, #26 shows the satellite with multiple steerable antennas).

As per **claims 9 and 26**, Natarajan teaches claim 8 wherein each of the controllable beams is a narrow beam (C3, L37-45).

As per **claims 10, 16, 17 and 33**, Natarajan teaches claim 1 and means for connecting one of said nodes to a backbone circuit (figure 1 shows Control Station #22 connecting to the PSTN #34 as does figure 2).

As per **claims 11 and 28**, Natarajan teaches claim 1 wherein at least one node is a satellit and at least one other node is a ground station (figure 1 and 2 depict this scenario).

**Claims 2, 14, 19 and 26** rejected under 35 U.S.C. 103(a) as being unpatentable over Natarajan/Briley and further in view of Chen US 4,975,712 (hereafter referred to as Chen).

As per **claims 2, 14, 19 and 26**, Natarajan teaches claim 1 **but is silent** on continuous scanning and includes phase shifters.

Briley teaches a continuous scanning electronic antenna (C8, L32-47). Such continuous scanning is realized by using continuously changing control signals on control lines CL.sub.1 to CL.sub.M. With a continuous scan system, an infinite number of beam pointing locations are obtainable over the scanning sector. Conversely, in a

discrete scanning system employing discretely changing phase shifters such as P-I-N diode phase shifters, the number of beam pointing locations are limited, and sidelobes tend to be higher. (This is also the case for the electronic switching type of scan system). Moreover, with discrete systems there is a finite switching time between beam pointing locations, which reduces the number of RF cycles associated with each data bit.

Chen teaches a two dimensional scanning antenna (title) that is an electronic scanning antenna (C2, L21 and C2, L30-40), uses phase shifters (abstract) and that the invention represents a significant advance in the field of electronically steerable antenna arrays. In particular, the invention provides a *less complex, lighter, and less costly configuration of beam steering elements*, without loss of efficiency or power transmission capability. Other aspects and advantages of the invention will become apparent from the following more detailed description, taken in conjunction with the accompanying drawings (C4, L10-20).

It would have been obvious to one skilled in the art at the time of the invention to modify Natarajan, such that the antenna continuously scans and includes phase shifters, to provide means for having an "infinite" number of beam pointing locations.

**Claims 5 and 22** rejected under 35 U.S.C. 103(a) as being unpatentable over Natarajan/Briley in view of Elson et al. U.S. Patent 6,317,100 (hereafter referred to as Elson).

As per **claims 5 and 22**, Natarajan teaches claim 5 **but is silent on** wherein the signaling channel includes a wide-angle antenna beam at each of the nodes

Natarajan does teach that each antenna can project its beam over several microcells C4, L35-36 AND one skilled in the art would provide narrow and/or wide angle antenna beams.

Elson teaches an antenna system adapted to provide antenna beams having various characteristics whereby the antenna system is adapted to provide wide antenna beams (on the forward link) [ABSTRACT]. One skilled in the art would provide wide-angle antenna beams on each/every node.

It would have been obvious to one skilled in the art at the time of the invention to modify Natarajan, such that the signaling channel includes a wide-angle antenna beam at each of the nodes, to provide to allow uniform radiation of signals throughout a desired area (such as a sector or cell).

**Claims 6, 23 and 31** rejected under 35 U.S.C. 103(a) as being unpatentable over Natarajan/Briley/Chen and further in view of Suzuki et al. JP-03165105 (hereafter referred to as Suzuki).

As per **claims 6, 23 and 31**, Natarajan teaches claim 2 and bi-directional communications (C3, L3-15 teaches phone calls to/from PSTN and user) **but is silent on** said phase shifters are analog phase shifters.

Suzuki teaches an electronic scanning antenna that uses analog phase shifter (abstract).

It would have been obvious to one skilled in the art at the time of the invention to modify Natarajan, such that analog phase shifters are used, to provide means for accurately setting the beam control.

**Claims 17 and 34** rejected under 35 U.S.C. 103(a) as being unpatentable over Natarajan/Briley in view of Hughes et al. GB2330734A (hereafter referred to as Hughes).

As per **claims 17 and 34**, Natarajan teaches claim 12 **but is silent on** comprising dynamically spreading the communication signal over multiple routes among the nodes and reassembling the signal at a predetermined node.

One skilled in the art realizes that satellite-to-satellite communication to connect two user around the world is known (eg. satellite crosslinks and/or multiple uplink/downlink hops are required to navigate the globe).

One skilled in the art also realizes that packet communications provides "spreading a signal over multiple routes among the nodes and reassembling the signal at a predetermined node (eg. similar to TCP/IP).

Hughes teaches routing signals through a wireless communication system comprising a network of linked nodes (title) whereby information is routed/hopped from node to node until it reaches its destination node. Information may be sent on different paths or may be split between two (or more) paths (abstract).

It would have been obvious to one skilled in the art at the time of the invention to modify Natarajan, such that it can dynamically spread the communication signal/message over multiple routes among the nodes and reassembling the signal/message at a predetermined node, to take advantage of the efficiencies of packet data communications.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen M. D'Agosta whose telephone number is 703-306-5426. The examiner can normally be reached on M-F, 8am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Trost can be reached on 703-308-5318. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Stephen D'Agosta
5-24-04

WILLIAM TROST
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600